

A quick guide for observing classroom content and practice

In **grade 1**, instructional time should focus on five core ideas:

## ESS

1. Earth's Place in the Universe

## LS

1. From Molecules to Organisms: Structures and Processes  
3. Heredity: Inheritance and Variation of Traits

## PS

4. Waves and their Applications in Technologies for Information Transfer

## ETS

1. Engineering Design

In a **1<sup>st</sup> grade science** class you should observe students engaged with at least one science concept and practice:

### Science and Engineering Practices

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

### Science Concepts

#### Earth & Space Science (ESS1)

- Observations of the sun, moon, and stars to describe apparent motion
- Analyzing data about seasonal patterns of change (sunrise, sunset, temperature, precipitation, environmental changes)

#### Life Science (LS1, LS3)

- Using evidence to explain the function of animal senses and body parts and the function of plant parts
- Comparing different animals' behavior that helps offspring survive
- Using observations to compare individuals of the same kind

#### Physical Science (PS4)

- Demonstrating the relationship of vibrating materials and sound
- Experimenting with different materials and light
- Designing and building a device that uses light or sound to send a signal

#### Technology/Engineering (ETS1)

- Gathering information and asking questions that can be solved by developing or improving an object or tool
- Generating and sketching multiple solutions to a problem

### NOTES

Comments on the Science and Engineering Practices:

- For a list of specific skills, see the *Science and Engineering Practices Progression Matrix* ([www.doe.mass.edu/stem/review.html](http://www.doe.mass.edu/stem/review.html)).
- Practices are skills **students** are expected to learn and do; standards focus on some but not all skills associated with a practice.

**STE What to Look For** The example below features three Indicators from the [Standards of Effective Practice](#). These Indicators are just a sampling from the full set of Standards and were chosen because they create a sequence: the educator plans a lesson that sets clear and high **expectations**, the educator then delivers high quality **instruction**, and finally the educator uses a variety of **assessments** to see if students understand the material or if re-teaching is necessary. This example highlights teacher and student behaviors aligned to the three Indicators that you can expect to see in a rigorous 1<sup>st</sup>-grade science classroom.

**Expectations**  
(Standard II, Indicator D) Plans and implements lessons that set clear and high expectations and also make knowledge accessible for all students.

**What is the teacher doing?**

- Creating culturally responsive lessons that engage and sustain student attention
- Supporting inquiry about what evidence is relevant to a scientific question
- Explaining the difference between a model and the object it represents

**What are the students doing?**

- Understanding what they will learn in a lesson
- Using information from observations to construct an evidence based account for natural phenomena
- Using scientific language precisely to convey meaning and understanding of concepts
- Identifying common features and differences between a model and the real object

**Instruction**  
(Standard II, Indicator A) Uses instructional practices that reflect high expectations regarding content and quality of effort and work; engage all students; and are personalized to accommodate diverse learning styles, needs, interests, and levels of readiness.

**What is the teacher doing?**

- Providing opportunities for students to communicate ideas, ask questions, and make their thinking visible in writing and speaking
- Designing lessons that support successful cooperation in culturally sensitive ways
- Asking students to describe patterns in observations

**What are the students doing?**

- Asking questions that can be answered by observations
- Discussing scientific ideas with other students
- Using counting and numbers to identify and describe patterns
- Making observations based on prior experiences

**Assessment**  
(Standard I, Indicator B) Uses a variety of informal and formal methods of assessments to measure student learning, growth, and understanding to develop differentiated and enhanced learning experiences and improve future instruction.

**What is the teacher doing?**

- Using multiple formative approaches to assess student learning (e.g., classroom conversation, completion of investigation)
- Providing concrete strategies to respond to feedback (e.g., emphasizing importance of recorded observations)
- Providing exemplars of work (e.g. historical examples, student work)

**What are the students doing?**

- Demonstrating learning in multiple ways (e.g., classroom conversation, completion of investigation)
- Engaging in challenging learning tasks regardless of learning needs (e.g., linguistic background, disability, academic gifts)
- With guidance, planning and conducting an investigation collaboratively with peers